THE EDINBURGH STEREOSCOPIC ATLAS OF OBSTETRICS

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In Four Sections, each containing Twenty-five Subjects, with Descriptive Text

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TO

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PREFACE

As the teaching of Midwifery has advanced, the illustrations have become more and more abundant; from the old wall diagrams and the woodcut of the text-book, have evolved the magnificent wall plates that now adorn our class-rooms, and the beautiful lithographs and chromo-lithographs which enrich the text-books, not to speak of the endless diagrams of a more or less ornate and accurate description which are placed in the hands of the students daily to illustrate their note-books.

The present editors have gone a step further, and, in my opinion, made a very material and important advance. By the introduction of photography they have been able to reproduce with absolute accuracy the various specimens with which the student ought to be familiar; and by the aid of the stereoscope they have made those illustrations so pronounced, clear, and definite, that the student can now study these stereograms with as much accuracy as if he had the actual preparation in his hands.

The labour and care which have been bestowed on each individual illustration make them not only of value to the student of medicine and general practitioner, but of interest to the specialist and an additional and very valuable aid to the teacher.

In tutorial work such illustrations must be of the first importance. The classes are essentially small, and here each separate illustration can be demonstrated with a realism which could only otherwise be attained by the examination of the actual specimen, which in many cases is either very rare, or too valuable for everyday handling. The arrangement of the illustrations is admirable. The editors present an exceptionally rich and very interesting series of normal and abnormal pelves, and the salient features in each pelvis, from the standpoint both of the pathologist and the practical obstetrician, are very clearly indicated.

Due attention is paid to the internal organs of generation, and the editors complete the atlas by a series of stereograms illustrating normal and abnormal gestation and labour. They have made excellent use of the ample material at their disposal for making these illustrations of labour and gestation specially impressive, taken as they are from actual life.

Interesting and valuable as these illustrations are to the teacher and specialist, they would be valueless to the student without a careful letter-press, and this the editors have succeeded in supplying. In addition to the full description which is attached to each stereogram, the main features are specially indicated above the photograph, so that while the student studies it, he can at once recognise the points to which his attention should be particularly directed.

As a teacher I welcome this atlas as a very important addition to our teaching power.

J. HALLIDAY CROOM.

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1. NORMAL FEMALE PELVIS.

General Structure.

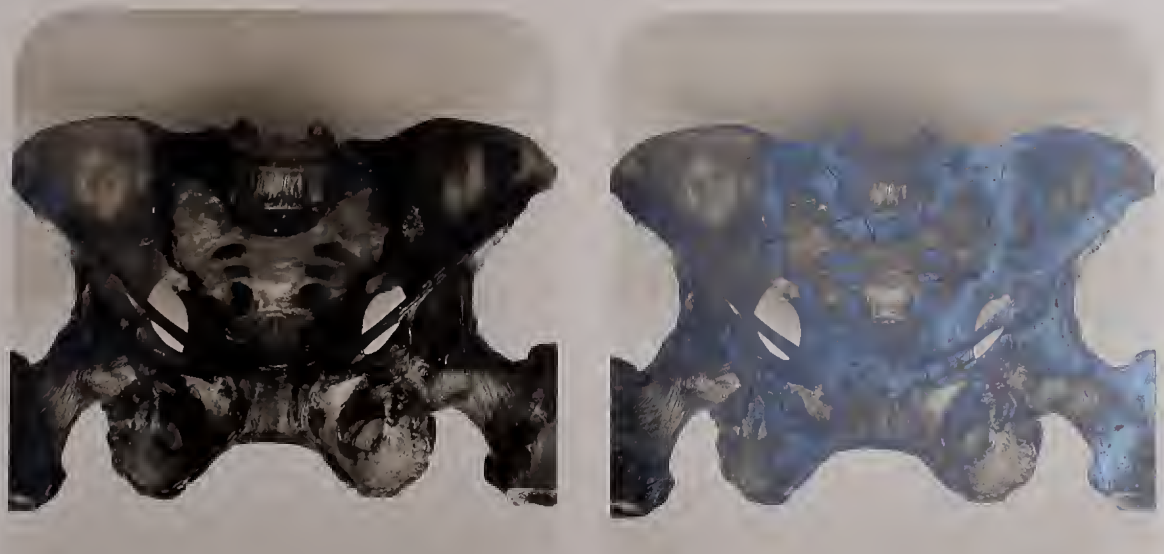
In both sexes the **Pelvis** forms the bony girdle through which the weight of the body is transmitted to the lower limbs, and by which the pelvic viscera are protected; but in the female its form is specialised to adapt it to the requirements of parturition. From an obstetrical point of view the Pelvis must be regarded as a bony canal through which the Fœtus has to pass.

The **Pelvis** is formed by the union of the Innominate bones with each other in front, and with the Sacrum and Coccyx behind. It is divided into two parts by a line—the Linea Terminalis—which begins at the centre of the promontory of the Sacrum behind, and curves forwards on each side along the anterior margin of the sacral wing and the ilio-pectineal line by the root of the pubic spine to the upper margin of the Symphysis Pubis. The upper and greater part is called the **False Pelvis**, and the part below the **True Pelvis**. The boundary between the two is known as the **Brim** of the True Pelvis, the **Inlet** of which it defines.

The **False Pelvis** is formed, laterally, by the fan-shaped expansions of the Iliac bones on either side; and posteriorly, by the two lower Lumbar Vertebræ; and completed, by the upper surfaces of the Pubes and lower portion of the anterior abdominal wall. It lodges the intestines in the non-pregnant woman, and the gravid Uterus during the advance of pregnancy.

The **True Pelvis** is bounded in front by the Symphysis Pubis in the middle line, and by the body and rami of the Os Pubis on either side; laterally, by the inner surfaces of the Ischia and ischial rami, and a part of the Ilium below the iliac portion of the ilio-pectineal line; posteriorly, by the anterior surface of the Sacrum and Coccyx. Springing from the middle of the posterior margin of each Ischium is the Ischial Spine, a structure of considerable obstetrical importance. The anterior margin of the base of the Sacrum is known as the Sacral Promontory, and has on either side two surfaces, the wings or alæ of the Sacrum. It is separated from the last Lumbar Vertebra by the thick anterior margin of a wedge-shaped disc of cartilage, such as is interposed between the bodies of the Vertebræ above. In adult life the Sacrum consists of five ankylosed Vertebræ; and four slight permanent transverse ridges indicate the lines of separation. Between the sides of the Sacrum behind, and the Ischium and Ilium in front and above, is the Sacro-sciatic Notch, bridged across by the Sacro-sciatic Ligaments.

1



2. NORMAL FEMALE PELVIS.

Showing the important Diameters of the False Pelvis, and of the Inlet of the True Pelvis.

The **False Pelvis** presents certain features which give a guide to the character of the True, so that the measurements of its Diameters are of interest.

The **Interspinous Diameter** (1) is represented by a straight line joining the Anterior Superior Iliac Spines, and is normally 9 to 10 inches in length. The **Intercristal Diameter** (2) is represented by a straight line joining the most distant points of the Iliac Crests, and normally measures 10 to 11 inches. In a well-formed Pelvis the Intercristal diameter should be 1 inch longer than the **Interspinous**. The maintenance of the ratio existing between the measurements of the above diameters is of paramount importance, any disturbance in that ratio being suggestive of some abnormality in the shape of the True Pelvis.

The **Inter-Trochanteric Diameter** is usually 11 to 12 inches in length.

The **Pelvic Brim** or **Inlet** is more or less elliptical in shape, and as at all parts of the **True Pelvis** four diameters are usually described—an Antero-posterior or Conjugate, a Transverse, and two Obliques.

The Antero-posterior or Conjugate Diameter of the Pelvic Inlet (3) or Brim extends from the middle of the Promontory of the Sacrum to the inner edge of the upper surface of the Symphysis Pubis. This is known as the **Conjugata Vera** to distinguish it from the **Conjugata Anatomicalis**, which extends to the outer edge of the same pubic surface, and from the **Conjugata Diagonalis**, which is represented by a straight line from the middle of the Sacral promontory to the lower margin of the Symphysis Pubis. In the normal female Pelvis the Conjugata Vera of the Inlet is 4 inches in length, the Conjugata Anatomicalis $4\frac{1}{4}$ inches, and the Conjugata Diagonalis $4\frac{1}{2}$ to $4\frac{3}{4}$ inches. The difference between the measurements of the Conjugata Vera and the Conjugata Diagonalis is due to the pitch, the depth and the thickness of the Pubes, variations in which render the measurement of the latter a little uncertain.

The Conjugata Vera and Conjugata Diagonalis are conveniently distinguished as Promonto-suprapubic and Promonto-subpubic diameters respectively.

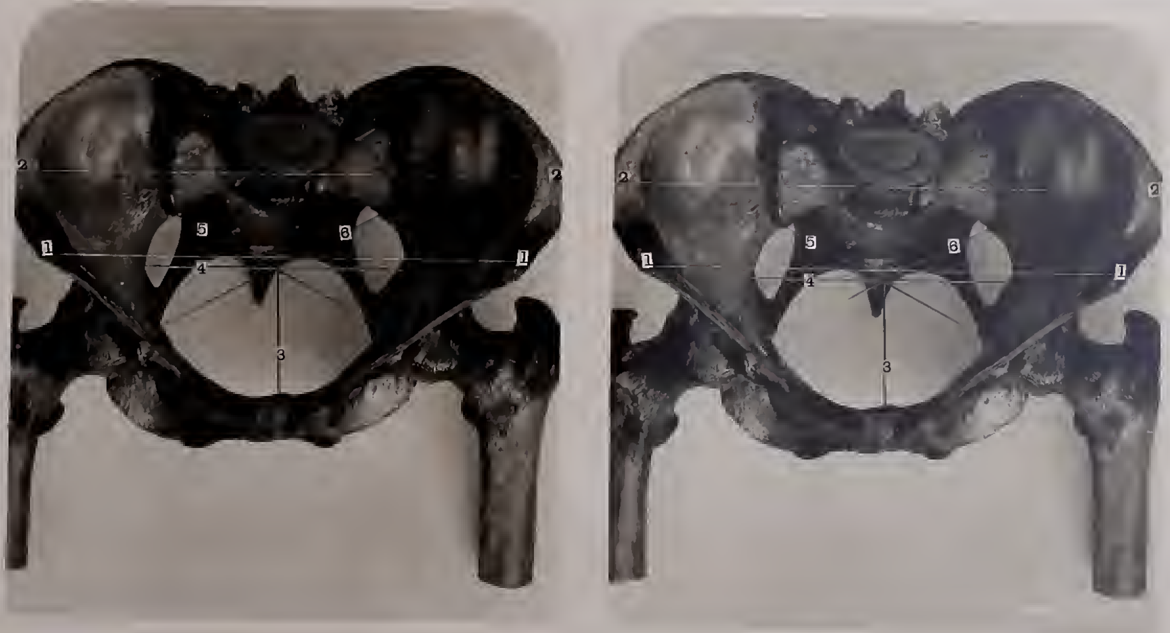
The **Transverse Diameter** (4) of the Pelvic Inlet is represented by the straight line drawn between the most distant points on the right and left Ilio-pectineal Lines, at right angles to the Conjugata Vera.

Each of the **Oblique Diameters** at the Brim (5 and 6) extends from one of the Sacro-iliac joints to the Ilio-pectineal eminence on the opposite side of the Pelvis, and is named Right or Left according to the joint from which it springs. The normal measurement of each is $4\frac{1}{2}$ inches. These Diameters are of importance, because in normal labour the long diameter of the Fœtal Head passes down through an Oblique Diameter, usually the Right.

The figures indicate :—

1. Interspinous Diameter of False Pelvis.
2. Intercristal Diameter of False Pelvis.
3. Conjugata Vera of Pelvic Inlet.
4. Transverse Diameter of Inlet.
5. Right Oblique Diameter of Inlet.
6. Left Oblique Diameter of Inlet.

2



3. NORMAL FEMALE PELVIS.

Showing the Boundaries and important Diameters of the Outlet.

The **Outlet** of the Pelvis is only understood from an obstetrical point of view when seen as in the stereogram with the strong sacro-sciatic ligaments running, the larger from the tuberosity, and the smaller from the spine of the Ischium to the margins of the Sacrum and Coccyx. The outlet thus constituted is seen as a rhomboidal space divisible into two triangular planes whose bases would meet on a line drawn between the two ischial tuberosities, which latter are at least an inch lower than the plane containing the apices of the triangles.

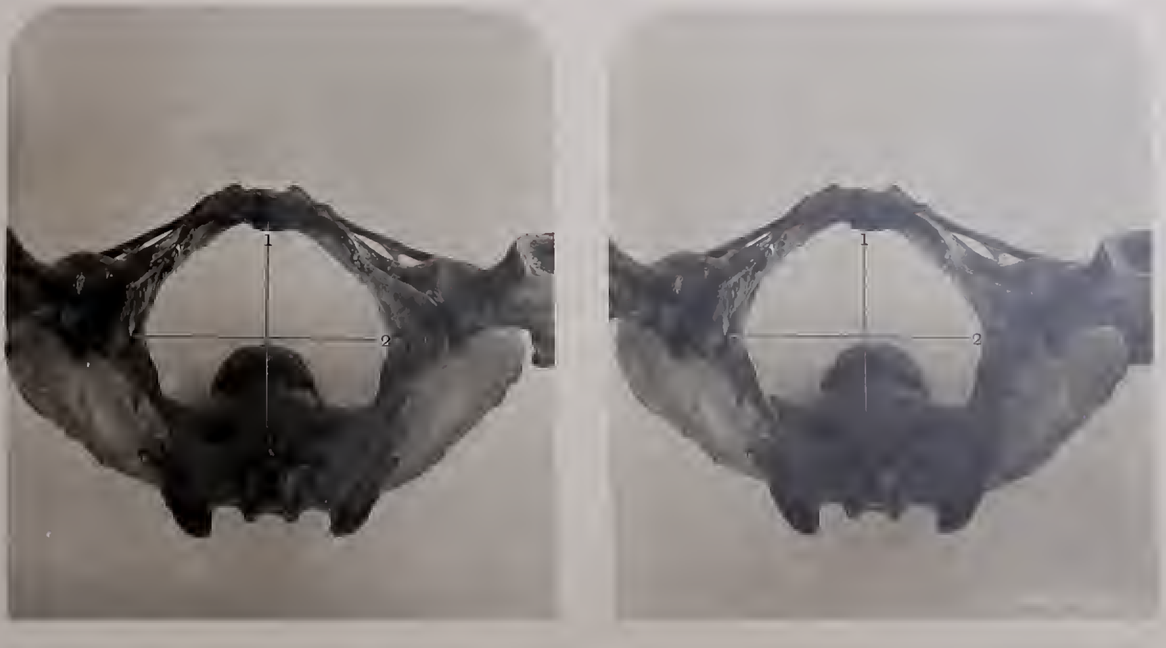
The Antero-posterior Diameter (1), with the Coccyx pushed backwards (as in labour), measures 5 inches, and the Transverse Diameter (2) 4 inches, each Oblique Diameter being about 4½ inches in length.

A section through the middle of the **Cavity** of the Pelvis would show that it was nearly circular, each of the Diameters measuring 4½ inches.

The figures indicate:—

1. Antero-posterior Diameter of Outlet.
2. Transverse Diameter of Outlet.

3



4. NORMAL FEMALE PELVIS.

Coronal Section showing the Transverse narrowing from Inlet to Outlet.

In order to show the gradual and progressive diminution in the lengths of the Transverse Diameters of the True Pelvis, on passing downwards from the Inlet to the Outlet, a coronal section has been made in a plane corresponding to these Diameters. The Intercristal or greatest Transverse Diameter of the False Pelvis (1) is 10 to 11 inches in length; the Transverse Diameter of the Inlet (2), 5 inches; the Transverse Diameter of the Cavity (3), 4½ inches; and the Transverse Diameter of the Outlet (4), 4 inches.

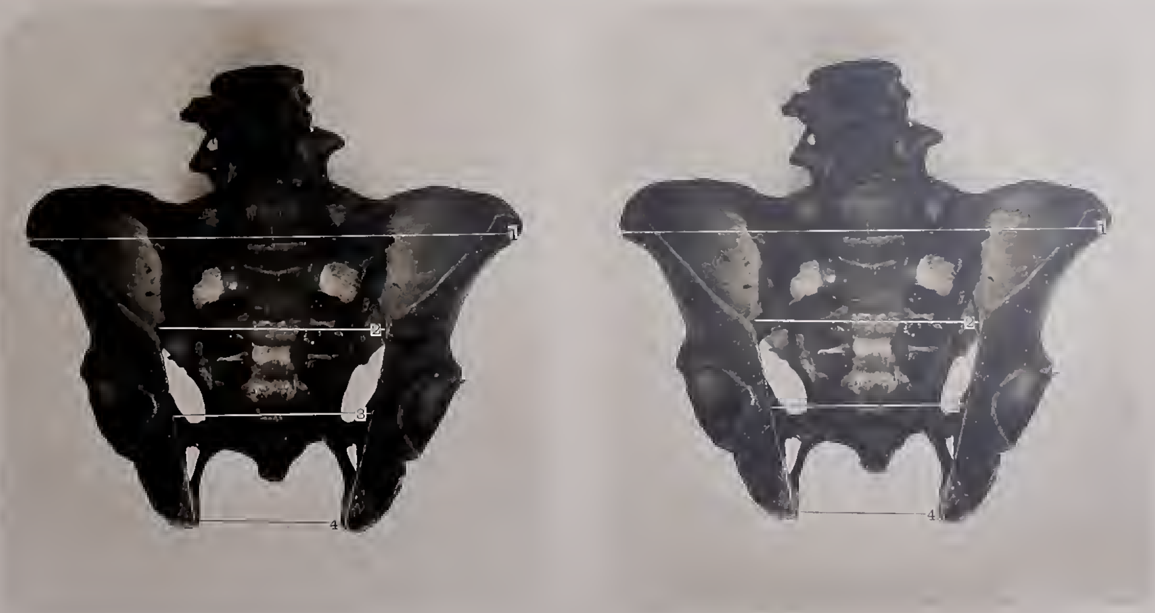
It may here be noted that the Antero-Posterior Diameters of the True Pelvis increase from above downwards in the same ratio as the Transverse Diameters decrease, that at the Inlet being 4 inches, in the Cavity 4½ inches, and at the Outlet 5 inches during labour.

The Intercristal Diameter has been proved to be approximately twice the length of the Transverse Diameter of the Pelvic Inlet (Sandstein). This point is of practical importance, owing to the difficulty experienced in ascertaining the measurement of the latter diameter in the living subject.

The figures indicate :—

1. Intercristal Diameter of False Pelvis.
2. Transverse Diameter of Inlet of True Pelvis.
3. Transverse Diameter of Pelvic Cavity.
4. Transverse Diameter of Pelvic Outlet.

4



5. NORMAL FEMALE PELVIS.

Sagittal Section showing the Conjugate Diameters of the Inlet and Outlet, and lateral aspect of Pelvic Wall.

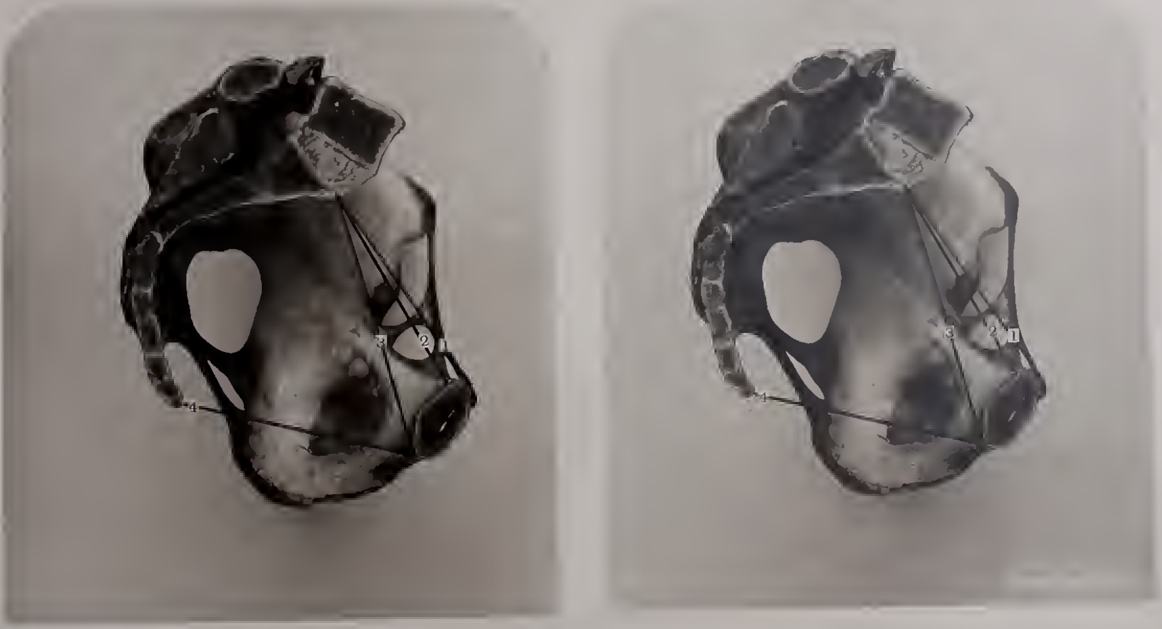
The various Conjugate Diameters of the Inlet have already been described.

The lateral wall of the bony Pelvis is well shown, with the various ligaments attached. The great Sacro-sciatic Foramen above and the small Sacro-sciatic Foramen below the Spine of the Ischium are formed by the bridging across of the Sacro-sciatic Notch by the great and small Sacro-sciatic Ligaments respectively. The Obturator Foramen, filled with its ligament, is also seen; its relative width in the Female is greater than in the Male. Extra space is afforded to the Cavity of the Pelvis by the presence of the Foramina at the extremities of the Oblique Diameters.

The figures indicate:—

1. The Anatomical Conjugate Diameter of the Inlet.
2. The Obstetrical Conjugate Diameter of the Inlet, Conjugata Vera, or Promonto-suprapubic.
3. The Diagonal Conjugate or Promonto-subpubic Diameter of the Inlet.
4. The Conjugate Diameter of the Outlet.

5



6. NORMAL FEMALE PELVIS.

Sagittal Section of Female Pelvis showing the Axis and Planes.

The Axis of the Pelvis is represented by an imaginary curved line (Curve of Carus), passing midway between the walls of the Pelvis from brim to outlet. It is obtained by joining the middle points of a series of lines, representing imaginary planes drawn from the Symphysis Pubis to the Sacrum and Coccyx.

The Axis of the Brim is seen as a straight line at right angles to the Conjugate; if extended downwards it would pass through the lower part of the Coccyx (P 8). It will be seen that the Axis continues as a straight line through the upper part of the bony canal until it reaches the plane running from the upper margin of the under surface of the Pubis to the second Sacral Vertebra. From this point onwards it is curved as it meets at right angles the successive planes that pass from the lower margin of the Symphysis Pubis to the Sacrum and Coccyx.

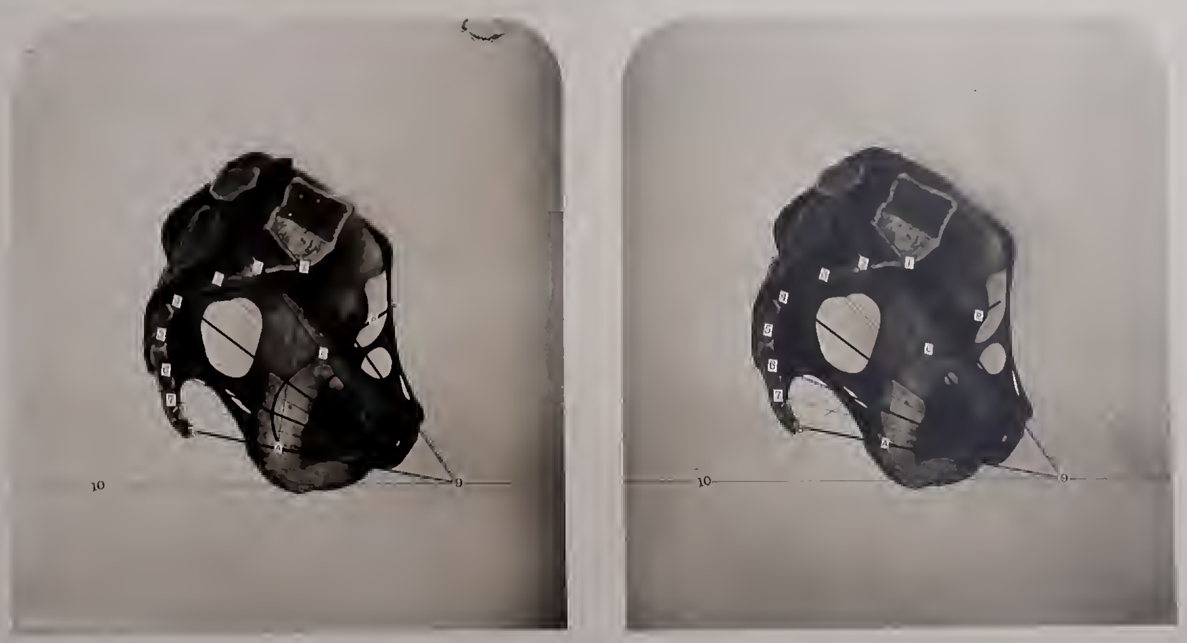
The Axis of the Outlet is prolonged upwards as a line striking the upper part of the first Sacral Vertebra (A 1).

The Axis may be taken as the line representing the direction followed by the centre of the Fœtal head during labour, hence sometimes called the Guiding Line.

The figures indicate:—

1. Plane of Pelvic Inlet.
2, 3, 4, 5, 6, 7, 8. Series of Antero-posterior Diameters or Imaginary Planes drawn from the Pubis to the Sacrum and Coccyx, the uppermost of which (2) is parallel to the plane of the Pelvic Inlet (1).
8-9. Plane of Pelvic Outlet.
9-10. Plane of Horizon.
P L A. Axis of Pelvis.

6

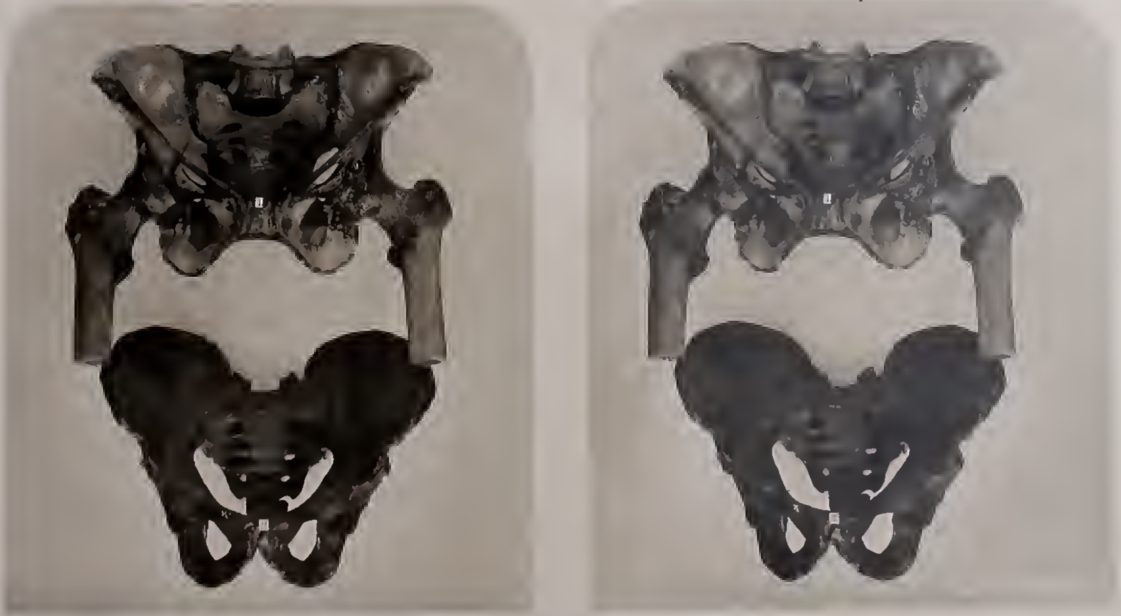


7. NORMAL FEMALE PELVIS (1)

As Contrasted with Male Pelvis (2).

Note, in comparing 1 with 2, the larger size of the brim, especially in the Transverse Diameter, the relative shallowness of the Cavity which widens at the outlet, the width of the Pubic Arch, the eversion of the Rami of the Pubes and Ischia, and the relative breadth of the False as well as of the True Pelvis as observed in the Interspinous and Intercristal Diameters.

7



8. UNIFORMLY AND UNIVERSALLY ENLARGED FEMALE PELVIS.

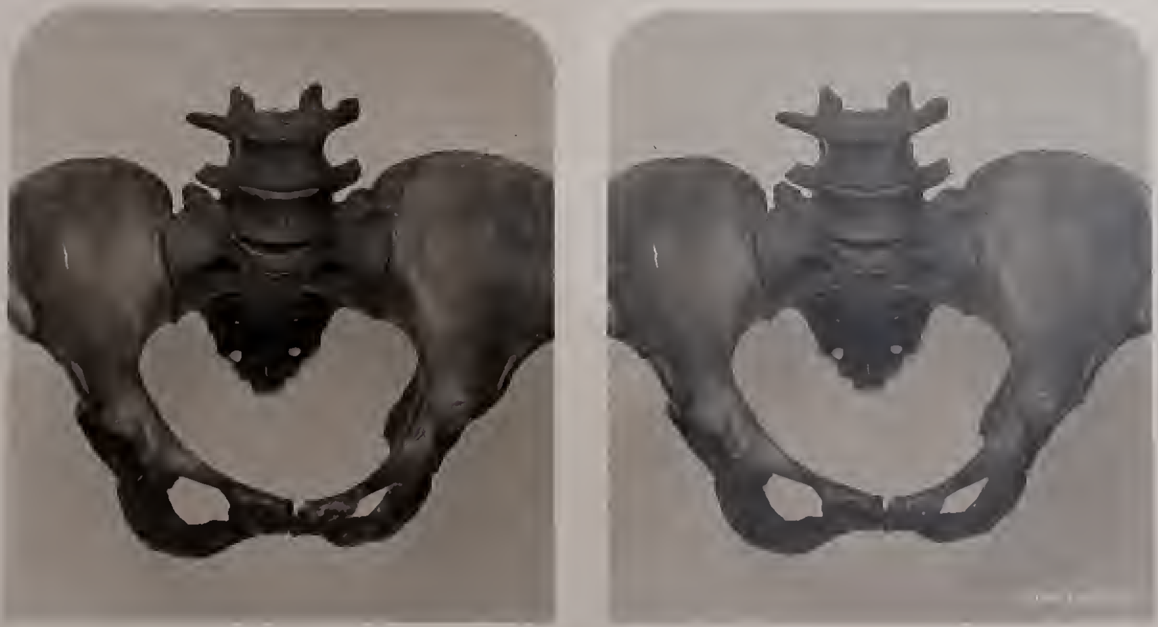
(Pelvis Æquabiliter Justo-major.)

This type of Pelvis shows alteration of the Diameters from the usual standard without any definite accompanying distortion of the bones.

All Diameters are enlarged in equal proportions.

Beyond the possibility of leading to precipitate labour, it is not likely to be a cause of trouble.

8



9. UNIFORMLY AND UNIVERSALLY CONTRACTED FEMALE PELVIS.

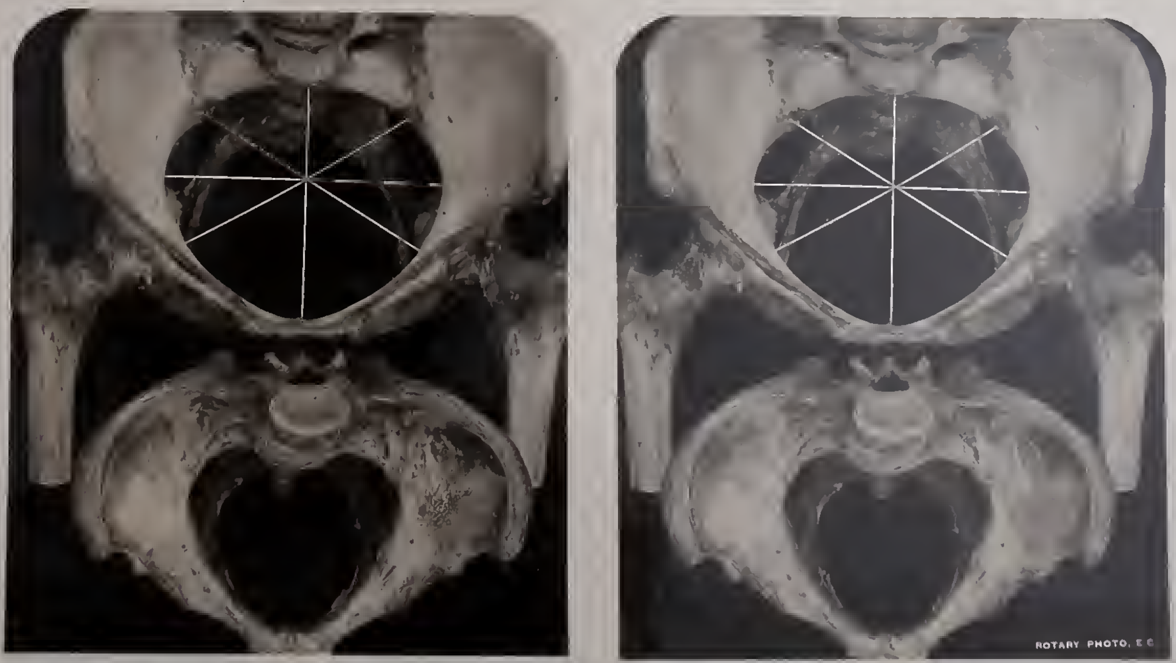
(Pelvis Æquabiliter Justo-minor.)

With Normal Female Pelvis above for Contrast.

This type of Pelvis shows proportional diminution of all the Pelvic Diameters, which may amount to half an inch or more.

The lessening of the capacity of the Pelvis gives rise to excessive flexion of the Fœtal head during labour, and according to the degree of contraction may cause tedious labour or necessitate the use of forceps or more serious operative interference.

9

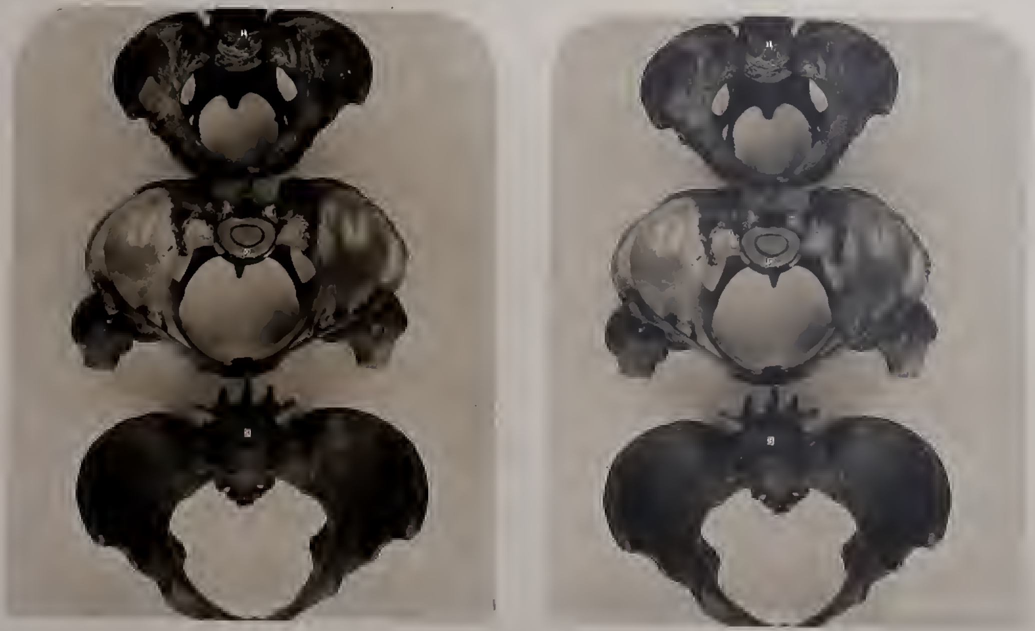


ROTARY PHOTO, E.C.

10.

1. UNIFORMLY AND UNIVERSALLY CONTRACTED PELVIS (Pelvis Æquabiliter Justo-minor).
2. NORMAL FEMALE PELVIS.
3. UNIFORMLY AND UNIVERSALLY ENLARGED PELVIS (Pelvis Æquabiliter Justo-major).

10



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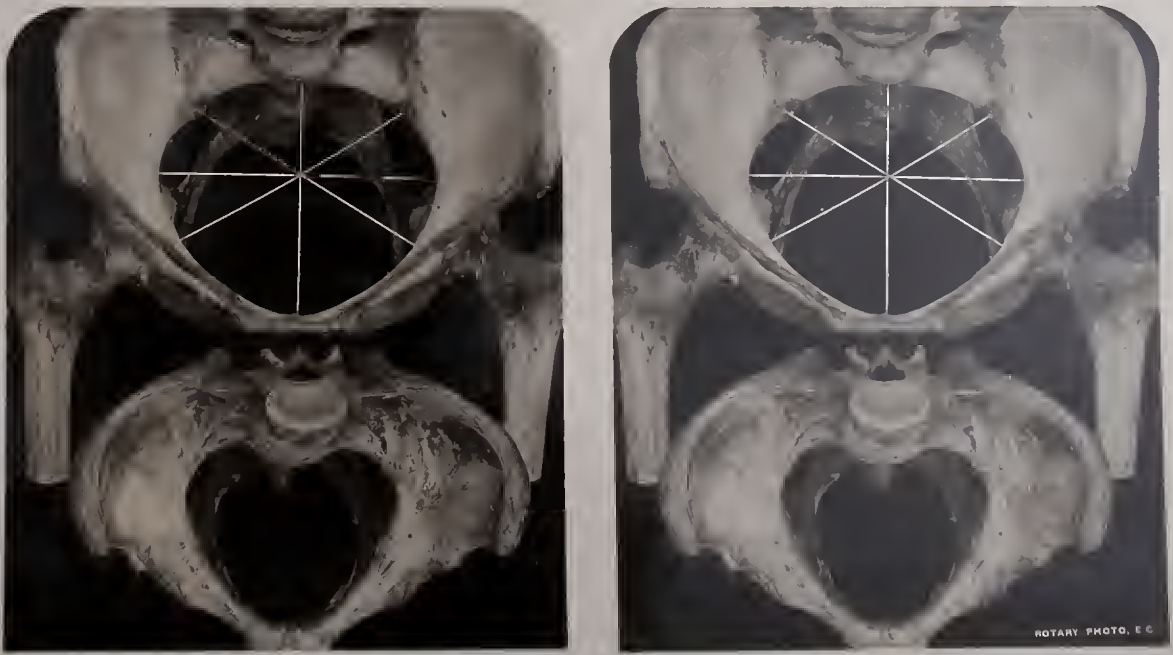


ROTARY PHOTO, E.C.

12. SPINOUS PELVIS.

(Pelvis Spinosa, Thorny Pelvis.)

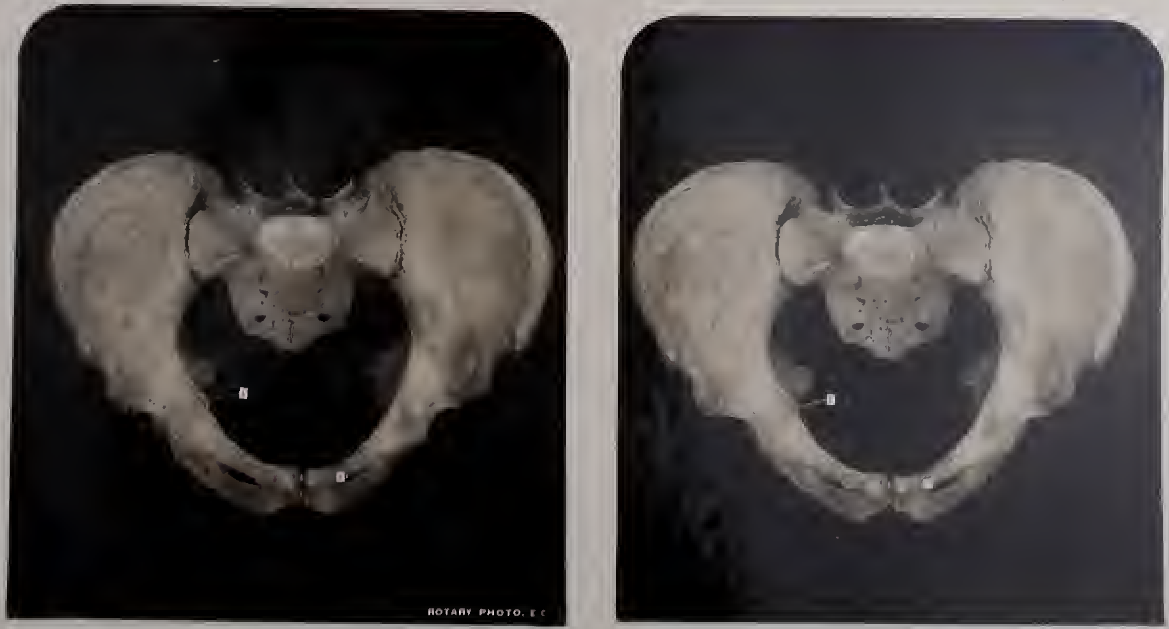
Characterised by small sharp Exostoses, which are occasionally found in the region of the joints or on the Ilio-pectineal Eminences, and may become the source of injury to the Uterus or Fœtus during labour.

In such cases the Ischial Spines, as seen in this view, are apt to be unduly prominent, and likewise a consequent source of danger.

The figures indicate :—

1. Sharp Exostosis on right Ilio-pectineal Eminence.
2. Sharp Exostosis close to the Symphysis Pubis.

12



9. UNIFORMLY AND UNIVERSALLY CONTRACTED FEMALE PELVIS.

(Pelvis Æquabiliter Justo-minor.)

With Normal Female Pelvis above for Contrast.

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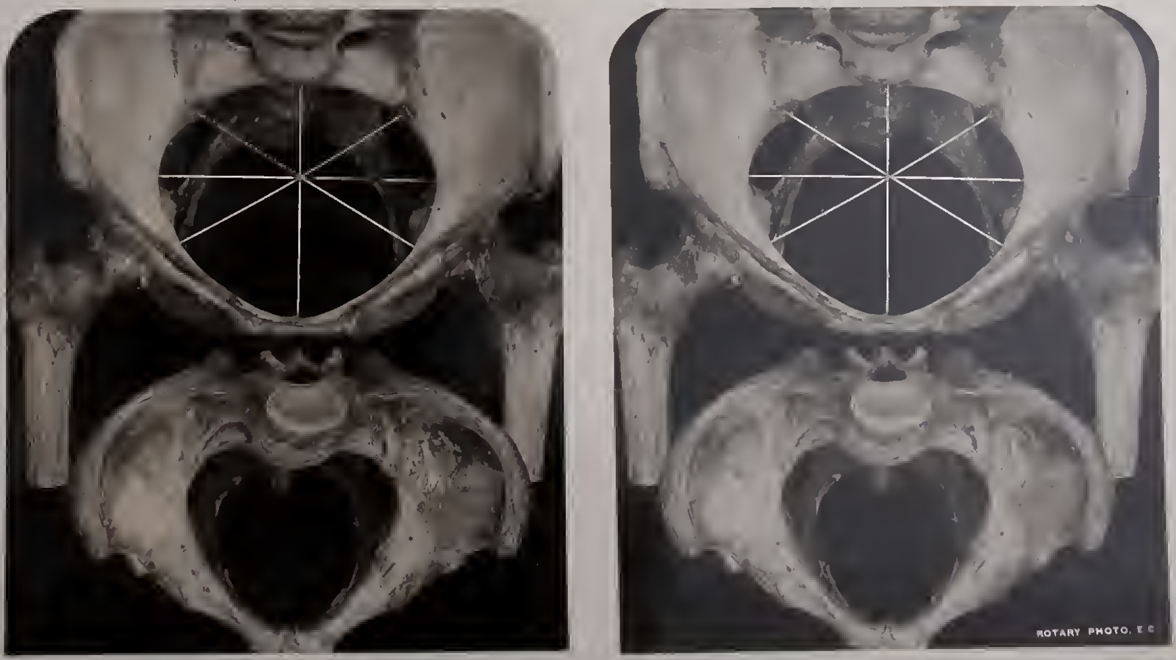
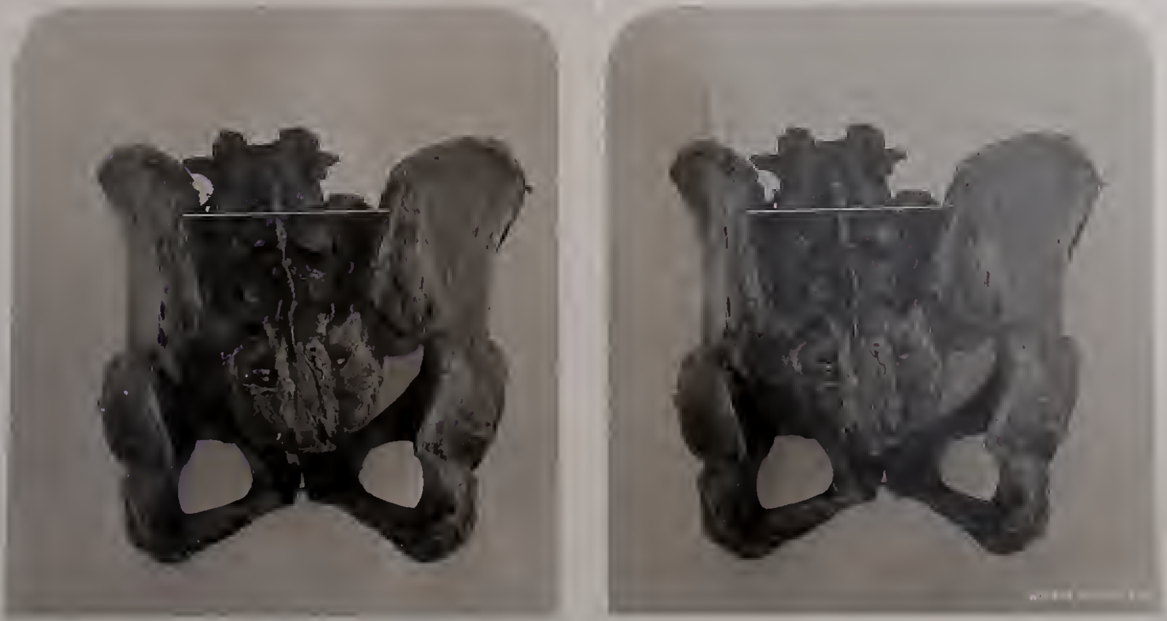


14. NAEGELE PELVIS.

(Posterior View.)

Note the approximation on the left (Ankylosed) side of the Posterior Superior Iliac Spine to the middle line.

14



15. ROBERT PELVIS.

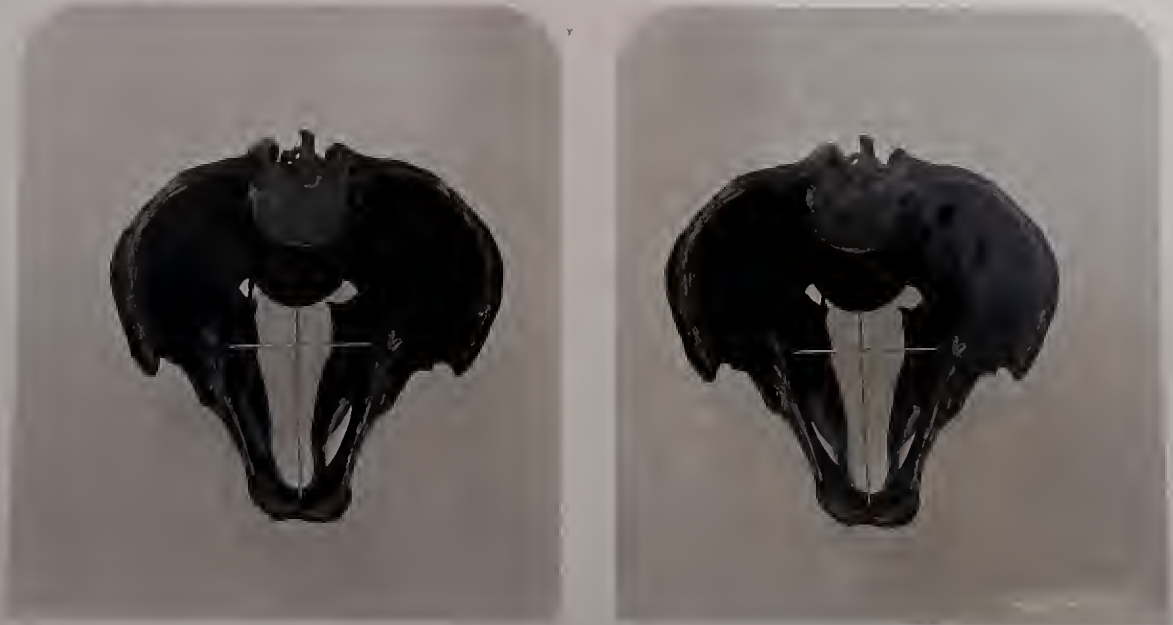
(Transversely Contracted Pelvis.)

The Sacro-iliac joints are ankylosed on both sides, the Sacral wings are absent, and the Innominate bones show deficiency in development.

The brim is oblong in shape, with the sides of the Pelvis more or less parallel to one another, and approximation of the spines and tuberosities of the Ischia, along with marked diminution of the pubic angle.

The Transverse Diameters are all contracted, and labour by the natural passages is rendered impossible, Cæsarean section being likely the only practicable mode of delivery.

15



16. RACHITIC PELVIS.

(Rickety Flat Pelvis.)

This type of deformity is one of the most important met with, and is due to the disturbances in ossification caused by Rickets in early life.

The Iliac Crests lose their sinuosity to some extent, and the Interspinous Diameter approaches (as in Stereograph 19), equals (as in accompanying Stereograph), or exceeds (as in Stereograph 18) the Intercristal Diameter.

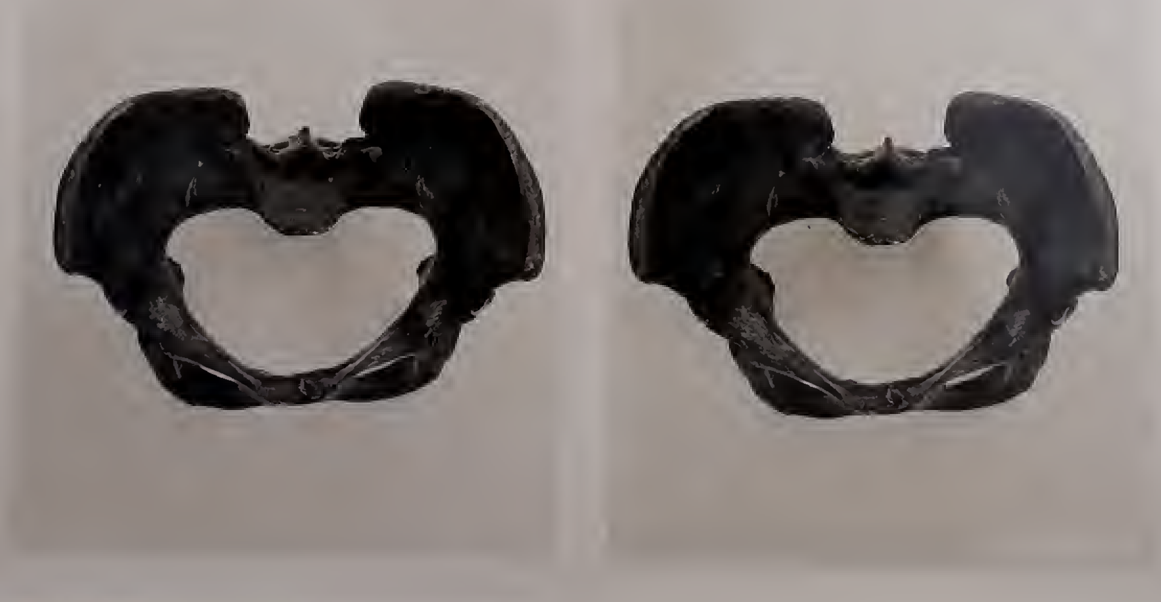
The Pelvic Inlet or Brim is kidney-shaped, due to the projection forward of the Sacral Promontory with contraction of the Conjugate Diameter and elongation of the Transverse Diameter. This elongation may be absolute, so that the Diameter exceeds 5 inches in length (see Stereograph 19). In the Pelvis here depicted, which illustrates a universally but unequally contracted Pelvis (compare with Stereograph 9, which shows a universally and equally contracted Pelvis), the Transverse Diameter is elongated relatively to the always shortened Conjugate Diameter.

The effects on labour vary with the degree of shortening of the Diameters, more especially of the Conjugate. If the Conjugate measures from 3½ to 4 inches, spontaneous delivery takes place with the following mechanism. As to Position, the Occiput is directed to one side of the Pelvis, so that the Long Diameter of the head occupies the Transverse Diameter at the Brim, instead of one of the Oblique Diameters as in the Normal Pelvis. As the head engages in the Brim, the broad part of the head tends to slide towards its own side of the Pelvis, so as to allow the narrowest Diameter (bi-temporal) to adapt itself to the shortened Conjugate. It descends through the Brim by a movement of extension (Michaelis' obliquity) involving a dip of the Sinciput in advance of the Occiput, aided by lateral obliquity (Naegele's) involving descent of one Parietal bone in advance of the other, and bringing the Sagittal Suture in some cases towards the promontory of the Sacrum, and in other cases towards the Symphysis. After the Brim has been negotiated the head comes into a roomy cavity, through which it passes with the usual mechanism. Owing to the flattening of the Sacrum, and the absence of the support to the Perineum afforded by the anterior curve of the tip of the Sacrum and Coccyx of the Normal Pelvis, the soft structures at the outlet become more liable to laceration.

If the Conjugate Diameter be under 3½ inches, spontaneous delivery by this mechanism may still take place if the head is small, but some form of artificial interference is more often required by means of forceps or turning (version) of the Fœtus. In forceps application in Pelves of this form, special care has to be taken not to apply the blades in the Occipito-frontal Diameter of the child's head.

With a Conjugate Diameter of 3 inches or under, Craniotomy, Cæsarean Section, Symphysiotomy, Hebotomy, or the Induction of Premature Labour, all have to come into consideration according to the requirements of individual cases.

16



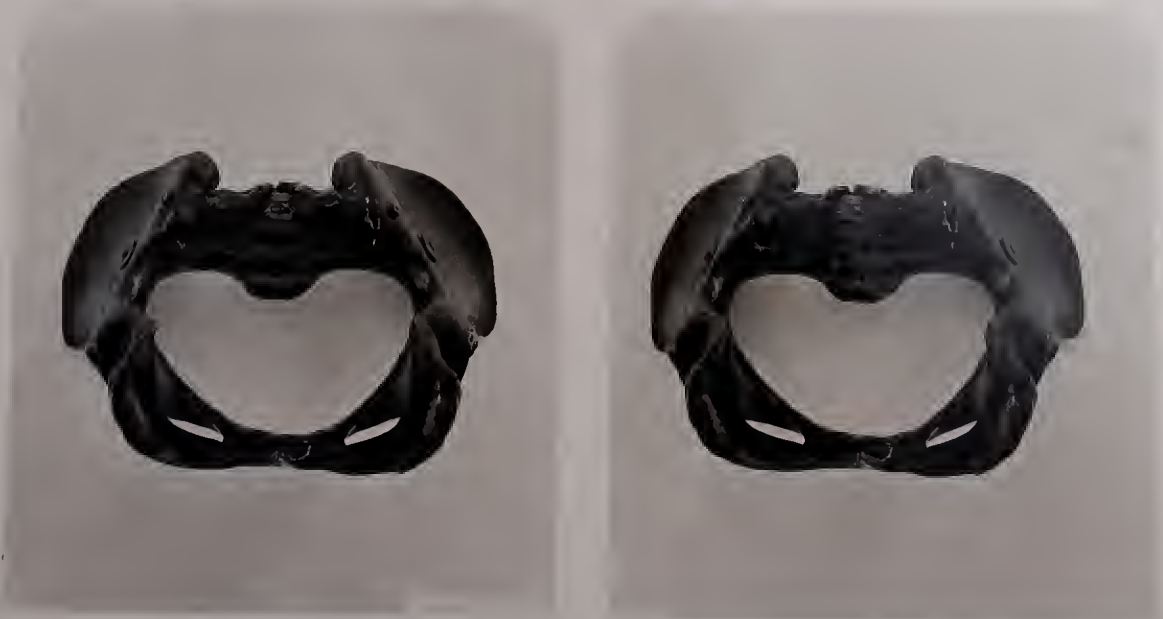
17. RACHITIC PELVIS

(Rickety Flat Pelvis), showing Outlet of No. 16.

The Pubic Arch is considerably enlarged, and the Transverse Diameter is increased owing to the separation of the Ischial Tuberosities.

On looking up through the cavity the reniform shape of the Inlet is seen with shortening of the Conjugate Diameter, due to the increased projection forwards of the Sacral Promontory. The flattening of the Sacrum, which implies diminution of its curve both in the perpendicular and transverse directions, is also to be noted.

17

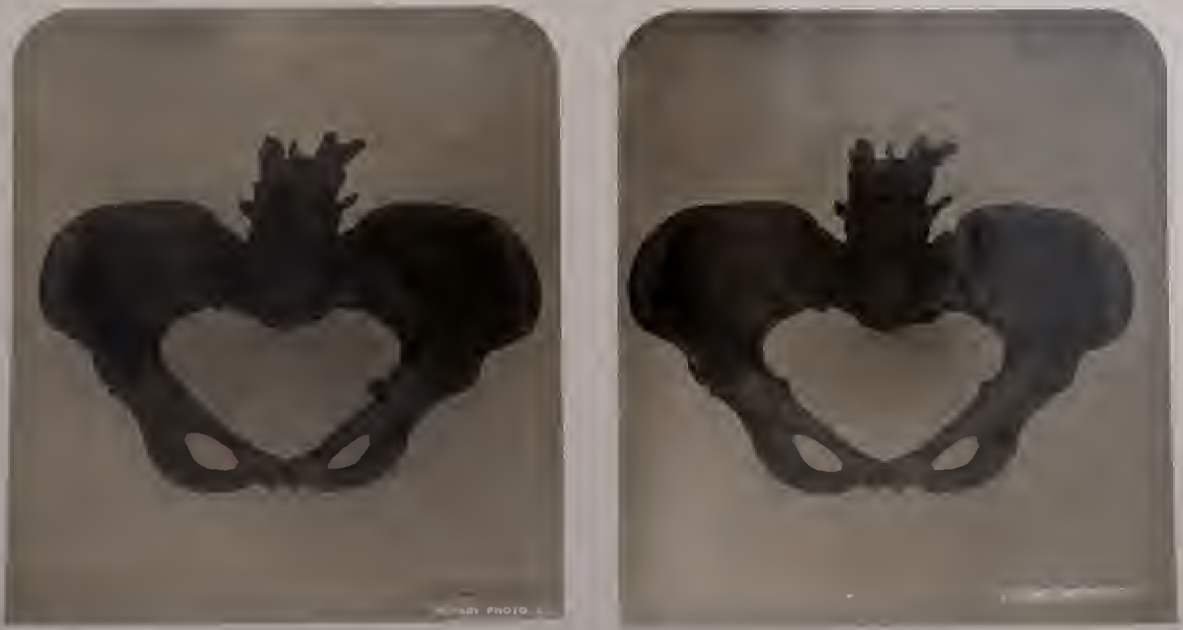


19. RACHITIC PELVIS.

(Rickety Flat Pelvis.)

In this Pelvis the length of the Interspinous Diameter is seen approaching that of the Intercristal Diameter. The Transverse Diameter of the Brim is absolutely lengthened in contrast to the narrow Conjugate Diameter.

19

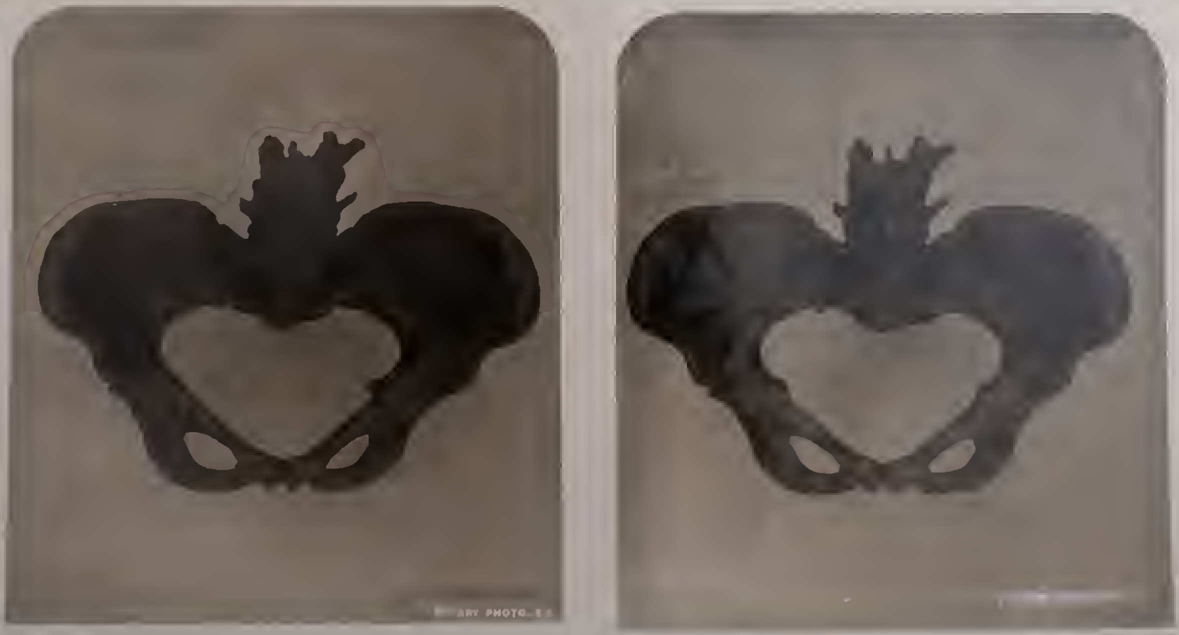


19. RACHITIC PELVIS.

(Rickety Flat Pelvis.)

In this Pelvis the length of the Interspinous Diameter is seen approaching that of the Intercristal Diameter. The Transverse Diameter of the Brim is absolutely lengthened in contrast to the narrow Conjugate Diameter.

19



20. MALACOSTEON PELVIS.

(Osteo-malacic, Tri-radiate, Rostrate, or Beaked Pelvis.)

This deformity is produced by Osteo-malacia (Mollities ossium), and is characterised by bending of the Iliac wings from before backwards, causing marked alteration between the Interspinous and Intercristal Diameters, the former being considerably less than the latter; the Iliac Fossæ are scoop-shaped.

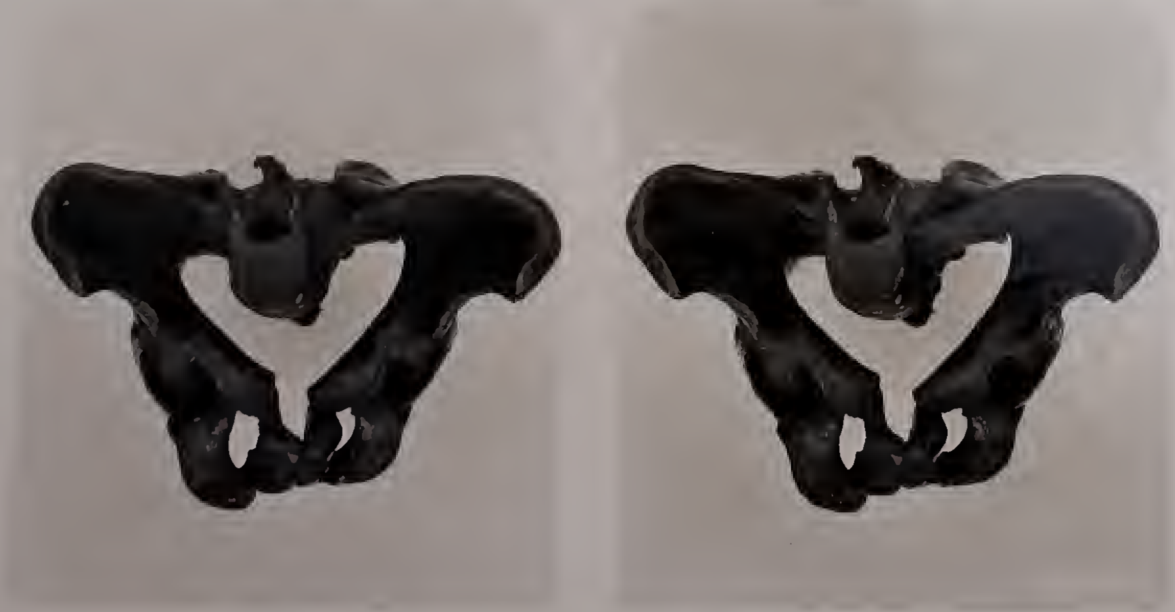
The Brim presents a stellate or tri-radiate shape, owing to the approximation of the Sacral Promontory to the Ilio-pectineal eminences. The pubic bones are folded towards each other behind the Symphysis, causing it to project like a beak.

The Sacral Promontory and supraposed Lumbar Vertebræ are pushed downwards and forwards, so that whilst the Anatomical Conjugate may be of normal length, the Conjugate space available for the entrance of the head of the Fœtus through the Pelvic Inlet is diminished.

In the specimen below it will be seen that the available Conjugate lies between the fifth Lumbar Vertebra and the approximated extremities of the Transverse Pubic Rami.

In contrast to Rickets, Osteo-malacia is a disease of adult life, and the treatment consists as a rule in delivery by Cæsarean section with removal of the Ovaries, which has been found to modify or completely arrest the bone disease, and obviates the risks of future pregnancy and labour.

20

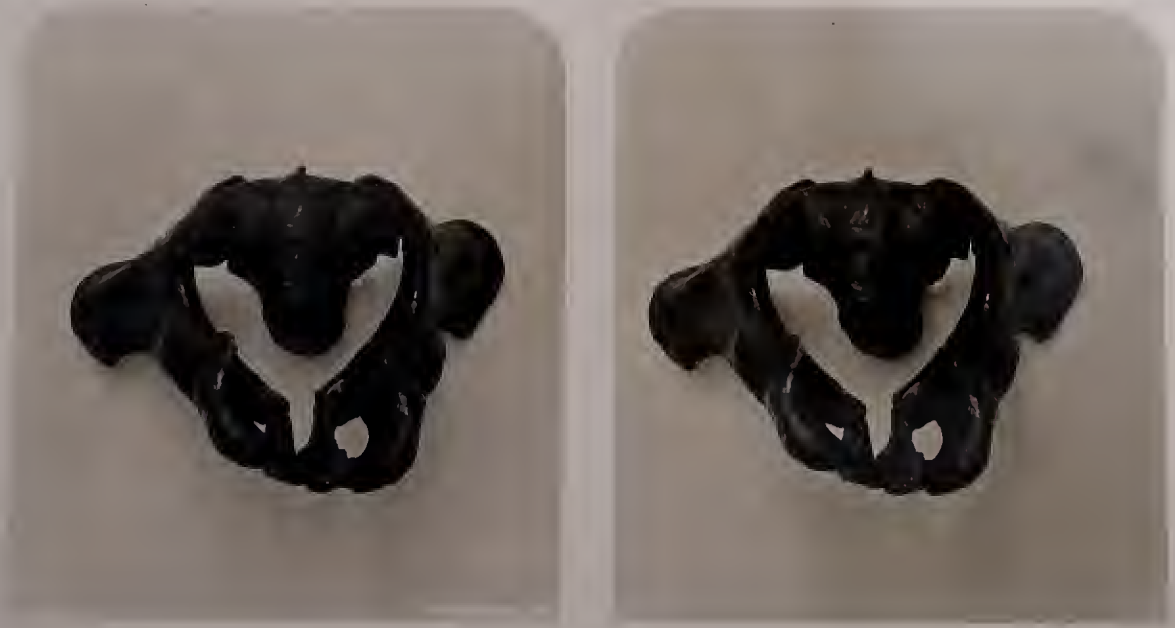


21. MALACOSTEON PELVIS.

Showing Deformities as Viewed from the Outlet.

The Pubic Arch is narrowed by the distortion of the descending Rami of the Pubes, and the Ischial Tuberosities are also twisted; the lower part of the Sacrum and Coccyx is folded up towards the Promontory of the Sacrum.

21



22. KYPHOTIC PELVIS.

From a Case of Kyphosis due to Dorso-Lumbar Caries.

(By kind permission of Professor Cunningham.)

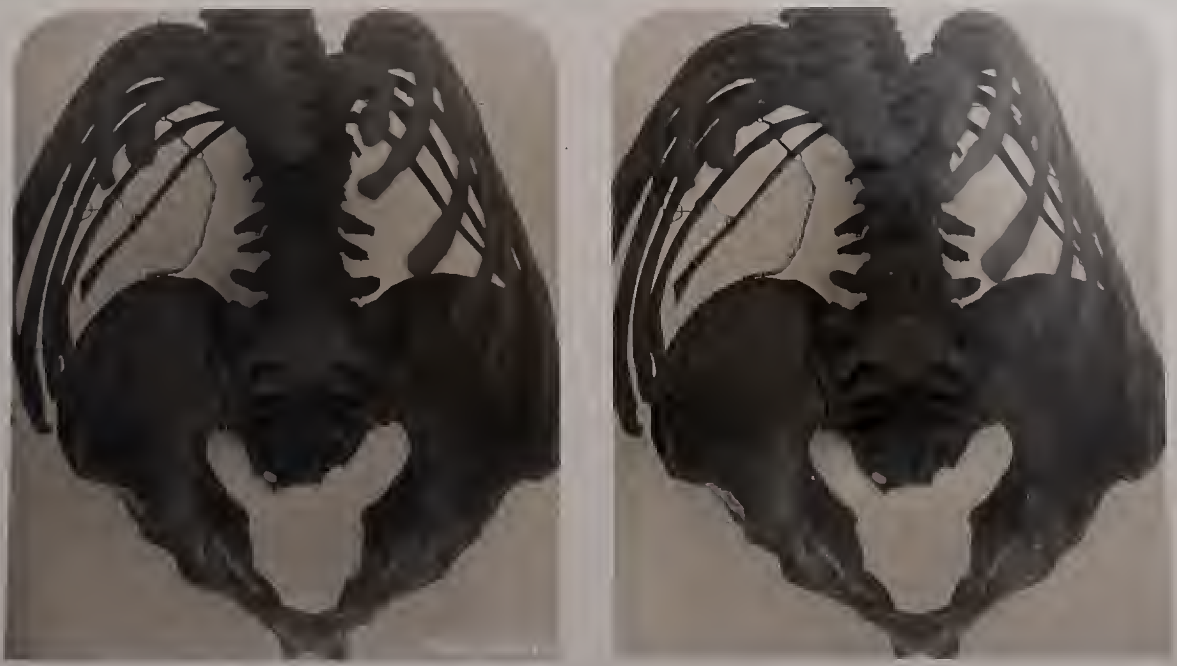
Note in the False Pelvis how the Iliac Crests become expanded and flattened. The anterior spines are thrown apart, while the posterior spines become approximated. The Fossæ look forwards and only slightly inwards. The Brim, oval in shape, is greatly elongated antero-posteriorly, and the Promontory of the Sacrum is situated at a higher level than in the Normal Pelvis.

The Transverse Diameter is diminished relatively to the Conjugate. The Sacrum is narrowed transversely and elongated vertically, more of its anterior surface being visible than in the Normal Pelvis. The cavity becomes markedly narrowed from above downwards, presenting a funnel-shaped appearance. The Pubic Rami meet at an acute angle, and the Pelvic Outlet is contracted, owing to the approximation of the Ischial Spines, Tuberosities, and Sacrum.

Obstruction to labour is caused as the head descends through the Pelvic Cavity, and owing to the narrowing of the Pubic Arch the head is kept far back, sometimes escaping behind the tuberosities of the Ischium, and always endangering the Perineum.

The treatment will vary according to the degree of contraction, indicating forceps or other more severe form of operative interference.

22



23. DEFORMED PELVIS AS THE RESULT OF HIP-JOINT DISEASE.

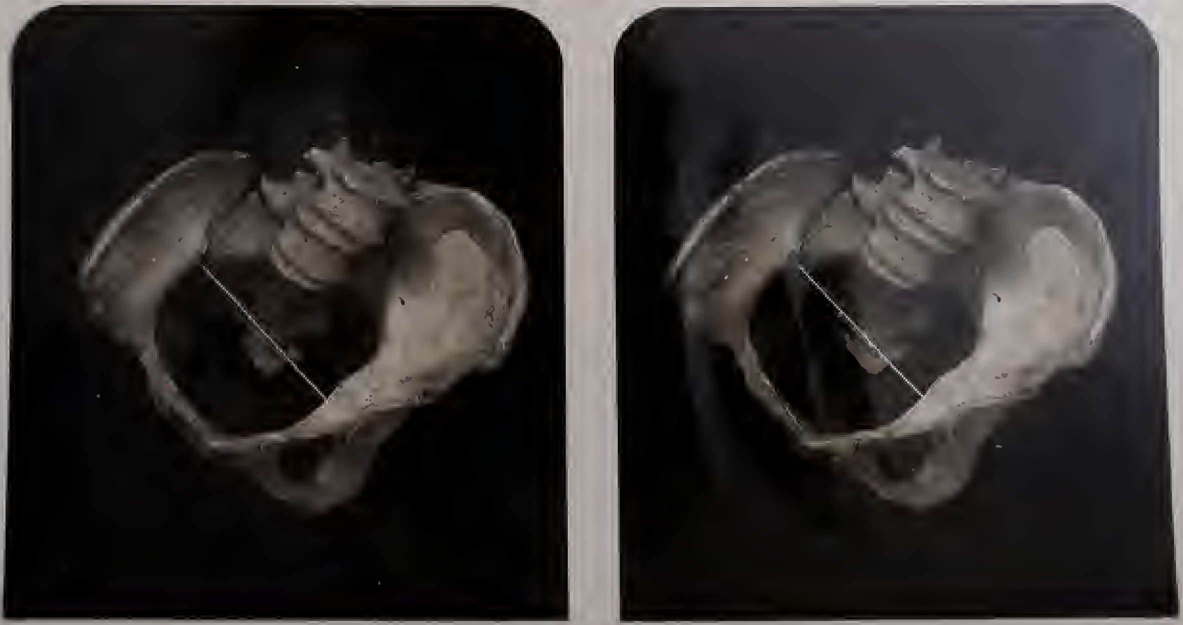
(By kind permission of Dr Barbour.)

Hip-joint Disease leads to contraction in one or other Oblique Diameter.

In consequence of the transmission of the weight of the trunk to the lower extremity through the healthy Acetabulum, the Innominate bone of that side becomes more or less flattened, so that the Oblique Diameter running towards it from the opposite Sacro-iliac joint becomes shortened.

In the specimen figured, in consequence of disease of the right hip-joint, the trunk weight has been habitually transmitted through the left Acetabulum, so that the right oblique diameter has become shortened.

23



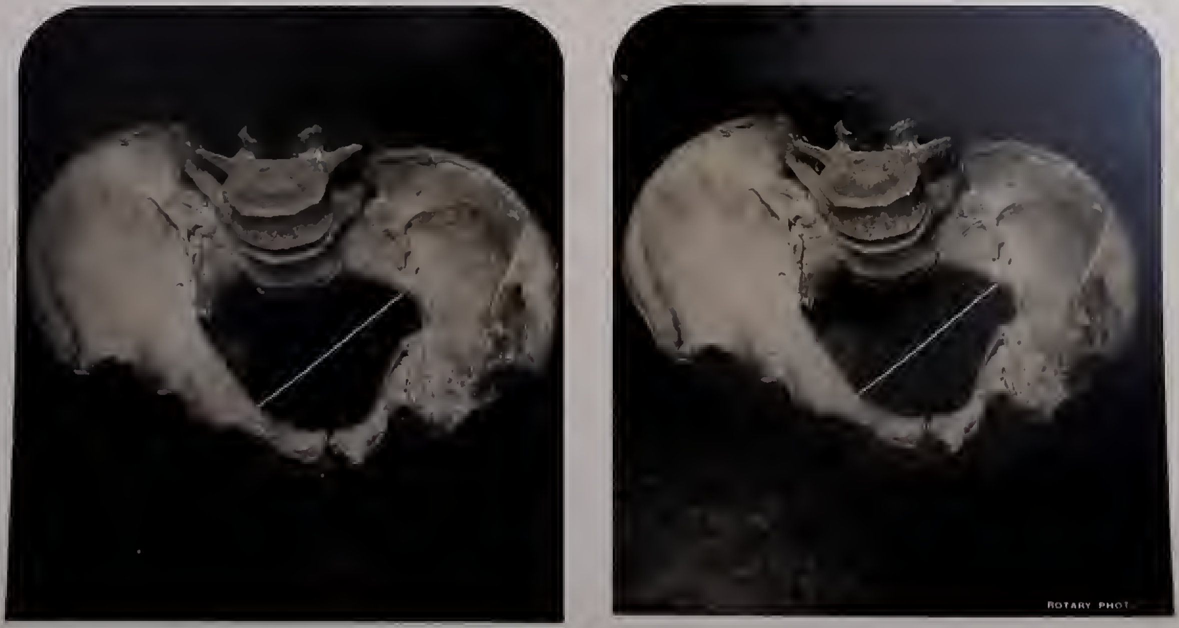
24. FRACTURED PELVIS.

(By kind permission of Dr Barbour.)

Fractures of the Pelvis may give rise to varying degrees of Pelvic deformity as a result of faulty union of the bones, ossification of joints in the neighbourhood of the fracture, and callus formation.

In the accompanying view the callus formation on the left Iliac Crest and ilio-pectineal line is shown, and the right sacro-iliac joint has also suffered damage. Apart from the encroachment on the Pelvic space by the fracture of the left Innominate bone, the Left Oblique Diameter seems to be shortened in consequence of atrophy of the right sacral ala and flattening of the right Innominate bone.

24

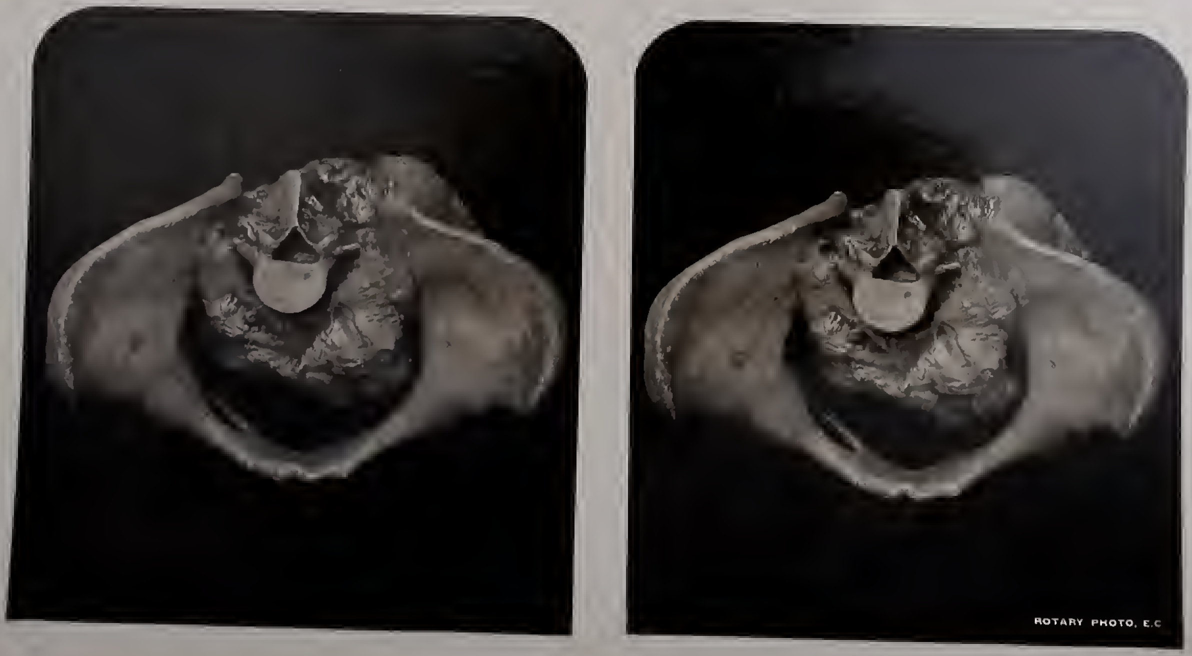


25. BONY TUMOUR OF PELVIS.

(By kind permission of Dr Barbour.)

Various types of Tumour (Fibroma, Sarcoma, Carcinoma, Enchondroma) may be found in the Pelvis, arising from the Sacrum or Innominate bones, and serious interference with labour may be brought about by consequent diminution in size of the brim or cavity, necessitating delivery by Craniotomy or Cæsarean section.

25



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